
Research Project Title

A Localized Safety Performance Functions Approach Accounting for “Within” Tennessee Variations on Freeways & Interchanges

Purpose of the Project

The objective of this research is to enhance transportation safety by applying the predictive method. In this regard, we will 1) develop freeway and interchange calibration factors for different Tennessee regions, 2) estimate Safety Performance Functions (SPFs) for freeways and interchanges in Tennessee, and 3) develop “highly localized” SPFs for freeways and interchanges in Tennessee to increase prediction accuracy. The study will investigate spatial and temporal variations in crash frequencies and associated factors using advanced statistical techniques such as the geographically weighted regressions. A key objective is to develop highly localized SPFs for freeways and interchanges in Tennessee by analyzing multidimensional safety data using powerful computational platforms and emerging analytics.

Scope and Significance

The scope of the research project includes: 1) Creating a unique database of crashes, roadway inventory, traffic, and demographics for freeways and interchanges, 2) Applying advanced methods to estimate SPFs accounting for spatial and temporal variations in safety within Tennessee, 3) Integrating the new concept of localized SPFs in TDOT’s network screening process, 4) Providing assistance to help users apply the predictive method contained in the Highway Safety Manual.

Expected Outcomes

The project aims to incorporate the predictive method in identifying appropriate countermeasures and improving transportation safety outcomes in Tennessee. The key expected outcomes are as follows:

- Accounting for crash heterogeneity within Tennessee will relieve TDOT from reliance on data collected in other states to predict future crashes in Tennessee.
- Supporting informed selection decisions for safety countermeasures, operations, and management of the existing freeways and interchanges.
- Assisting TDOT in safety-driven planning, design, and construction.
- Providing accurate predictions of safety performance enabled by using a highly localized approach (rather than using the "one-size-fits-all" approach).
- A national model for new analytics application to improve state-of-the-practice safety measures.

Time Period

The time period for the project is 24 months, starting in 2020.

Contact Information

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